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## RESEARCH ARTICLE

### A STUDY TO ASSESS NURSE CALL RESPONSE MONITORING – PROXIMITY A CONTRIBUTING FACTOR

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#### ABSTRACT

**Introduction:** Patient call bell generated from the patient room is an alert sign to the health care professionals about patient need. Attending a call bell by nurse should be immediate and if it delays safety and emergency intervention required can be at stake. Many a time patient call bell response delayed is directly proportional to patient satisfaction and patient outcome. Call bell is a communication key for the patient when hospitalized and nurse should always give priority to attend call bell. **Aims & Objectives:** The primary aim of the study is to identify the time taken by nurse to attend the call bell. The secondary objective is infrastructure contribution to minimize the time duration for attending the call bell. **Methodology:** A total of 16543 call bells were monitored by call bell monitoring system for 3 months from June to August 2018. The call bells were monitored for 2 floor which were 9<sup>th</sup> floor and 10<sup>th</sup> floor. Each floor is of 18 rooms and two nursing counter to each floor thus 9rooms to each nursing counter. The call bells respond time duration was monitored for each of the call generated by patient in Dr L H Hiranandani Hospital, Powai, Mumbai, India. **Result:** 36 rooms were monitored for 3 months for the patient call bell response by nurse. Each floor is of 18 rooms and distance was taken from the nursing counter. The highest distance is room no 9001 and 1001 that is 82 feet and nearest room are 913 and 1013 which is 35 feet. Total of 16543 calls were generated in 3 months from all rooms. 94.88% of total calls were attended by nurse in 1 minute, 3.65% calls were attended in 2 minutes, 0.88% calls were attended in 3minutes, 0.27% of calls were attended in 4 minutes where as 0.12% of calls were attended in 5 minutes and only 0.18% of call were attended in more than 5 minutes. The study has proved that nurses are active and alert to address the call bell and infrastructure of the hospital is one of the factor to minimize the time duration for call bell response. **Conclusion:** Call bell is the primary key for patient to communicate in the hospital and responding to call bell generated by patient is also priority of nurse. The study has proved that 94.88% of calls were attended with in 1 minute which evidenced nurses priority for attending the call bell. Infrastructure of the hospital helped the nurses to attend the call in minimum time. Call bell response by nurses in minimum time remains our primary goal.

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#### INTRODUCTION

A call bell is a vital patient communication link for the hospitalized patient. Call bell alert and nurse response to the call bell remain ongoing alert to the nurses on duty to attend the patient for their needs. The call bell systems have a mechanism to show an alert at the nursing counter with the different colour and ring tone according to the need of the patient. This will help the nurse to identify the urgency of the call and respond accordingly.

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This save the time and minimize the interruption along with the urgency of call (Miller, 1997; ECRI, 2001 and Taylor, 2004). Nurse patient interactions are foundational to care that is desired by the patient. The call by patient demands the care. Intentional interaction of nurse – patient is established for giving care that is expected by the patient. Initiation of call and response to call bell is crucial for the patient and response by nurse is critical for that (Duffy, 2012; Morse, 1997 and Peplau, 1997). Nurse call bell response is taken into consideration because it directly reflects the patient care in hospital and patient satisfaction with hospital care (Deitrick, 2006 and Meade, 2006). The call bell is the patient lifeline in hospital to

provide attention to the hospitalized patient. The structure of organization and technology for call bell system will help the nurses as well as patient satisfaction and improves the patient care in their need (Rashid, 2006 and Meade, 2006). When patients use the call light, it is usually to summon the nurse for information or assistance. Patients expect that when they push the call light button, a nursing staff member will answer or come to them. However, the statement that call lights are perceived as noise and interruptions to nursing tasks (instead of an important way for patients to request assistance) is true according to some nurses (Meade, 2006). The patient call bell response not done then they will not feel safety in hospital and the perception will create anxiety and insecurity among patients specially the vulnerable patients. The delay in response to call bell will affect the nurse patient interpersonal relationship and communication which will lead to dissatisfaction among patients. The nurse s must recognize that the call response is very important to meet the patient need and safety in the hospital (Deitrick, 2006). Call bells are prevalent in inpatient healthcare facility for nursing care across the nation. These facilities are there in almost all hospitals but how importance we are giving to response to call bell need to analyze and technology also influence on this. The technology is directly related to the patient need & meet or to establish patient communication. Response to call bell impact on the patient safety and quality of patient care (Tzeng, 2012; Tzeng, 2010 and Roszell, 2009). When the call list is on, the staff must attend the call and assume that the patient is in need, and find out the problem according to the priority and solve it. The first response should be immediate and find out the need of the patient. Their only life line is a small plastic call bell button (Robert Kraft, 2014). If not responded in time we may fail to attend even emergency situations that can harm the patient.

### Objectives

- To identify time taken by nurse to attend call of the patient.
- To evaluate the factors associated with call response and infrastructure (Proximity).

### METHODS AND MATERIAL

- **Research approach-** For the above study we adopted a quantitative research approach.
- **Research Design-** The research design adopted for the study was Descriptive observational.
- **Research Setting-** The study was conducted in Dr L H Hiranandani Hospital, Hiranandani Gardens, Powai, Mumbai, India 400076.
- **Population-** Call bells attended by Nurses.
- **Sample** - Call bell attended by nurses on 9<sup>th</sup> and 10<sup>th</sup> floor (Single A/C Room)
- **Sampling technique-** The sampling technique adopted for the study was non probability sampling (Convenient)
- **Sample size** -16543 Call bell Response.
- **Tool** – Nurse call response monitoring tool.
- **Study interval-** 3 months (June, July, August 2018)

### Methodology

This research was conducted in a tertiary care center Dr L H Hiranandani Hospital Powai, Mumbai, India. The Hospital is 244 bedded superspeciality hospital in Mumbai. A quantitative

descriptive study was conducted to monitor patient call bell response by nurse and to evaluate the contributing factors as proximity. 16543 call bells analyzed in the hospital with call bell response monitoring of 9<sup>th</sup> and 10<sup>th</sup> floor of hospital with call bell tracking system. The patient call light system refers to the call light that a patient uses in their room, either from the bed, bedside chair or commode. The system electronically records the response time of each call. It does not record the time taken to complete the task by the staff. The call response time was calculated based on the information retrieved from the call tracking system. Consequently, when generating a call report, the number of the covered days is automatically indicated. The information on the number of the covered days was used in this study for justifying the count of the total calls for the defined period. 36 rooms of two floors which are of 18 rooms each are monitored. The call response from each room was monitored for 3months. The distance from nursing counter to each room was taken on both floor and evaluated further. The call bell monitoring done for every room in the time interval and on the both floor and then it was evaluated according to the distance from the nursing counter and assessed about infrastructure contribution towards responding the call bell by nurse.

### RESULTS

The present study conducted to find out the time taken by nurses for attending patient call bell. The infrastructure of hospital helped the nurses to attend call bell in minimum time and also found the association between call response and room distance. The patient call bell is the primary key in the hospital to communicate. Nurses are busy always with their task but they try to attend the call bells at the earliest. Proximity helps to minimize the delay and achieve their goal. In this study the call response is system generated and so evidence based. The 16543 call bell responses were monitored by patient call bell system for 36 rooms for 3 months. The time taken by the nurse to attend the call bell and also the distance from nursing counter to each room was measured and identified the call response time and infrastructure contribution.

**Table 1. Call response from each floor for 3 months**

MONTH	TOTAL CALL	9 <sup>th</sup> FLOOR	10 <sup>th</sup> FLOOR
JUNE	5017	2814	2203
JULY	5344	3162	2182
AUGUST	6182	2928	3254
TOTAL	16543	8904	7639

**Table 2. Distance from nurse station to room in feet**

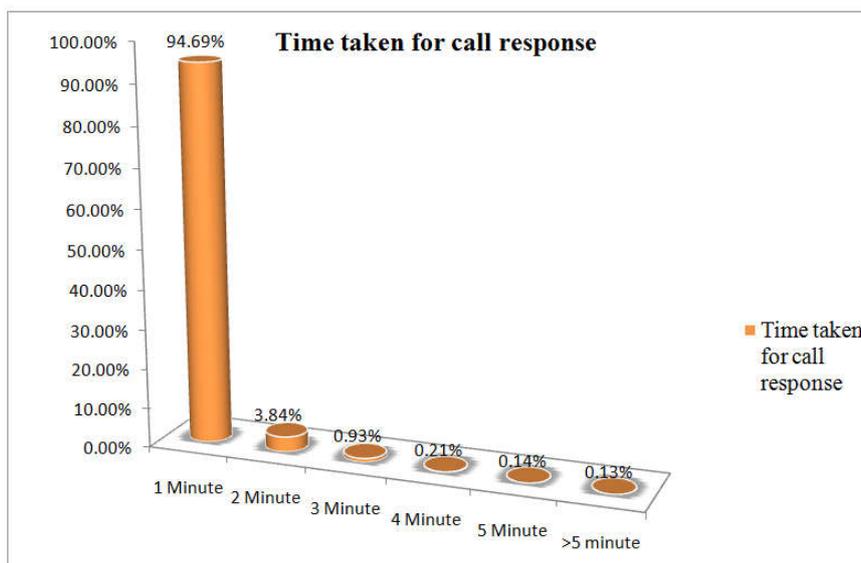
Room no	Room No	Distance from nurses station in feet
901	1001	82
902	1002	67
903	1003	59
904	1004	42
905	1005	38
906	1006	50
907	1007	57
908	1008	75
909	1009	62
910	1010	62
911	1011	66
912	1012	39
913	1013	35
914	1014	36
915	1015	41
916	1016	60
917	1017	58
918	1018	40

The above Table 1 shows that the total calls generated in 3 months were 16543. The calls generated from 9<sup>th</sup> floor were 8904 and from 10<sup>th</sup> floor 7639. The call bell responses for 3 months were monitored for June, July and August 2018 and both the floor is single A/C room with same infrastructure. Total calls generated in month of June are 5017 where in July 5344 and in August 6182 which increased the frequency and response to call bells. The nurses tried their level best to attend each call in the minimum time and respond to the patient's need. The above Table 2 is for room distance from the nursing counter to each room. The 9<sup>th</sup> floor is of 18 rooms in which the maximum distance is 82 feet which is room no.901 and lowest is 35 feet that is room no. 913 and on 10<sup>th</sup> floor Room no. 1001 is of 82 feet the lowest is Room No 1013 which is 35 feet. There are two nursing stations on each floor and both the sides call bell monitoring is done. The rooms are equally distributed on both the floors.

The highest call generated is from room no. 908 that is 810 calls generated and out of that 759 calls were attended in 1 minute and 37 calls in 2 minute and 8 calls in 3 minute where as only 3 calls attended in more than 5 minutes. Total 8904 calls generated on the 9<sup>th</sup> floor out of that 8432 calls were attended in 1 minute and 345 calls were attended in 2 minutes and 83 calls were attended in 3 minutes, 19 calls were attended in 4 minutes and 15 calls attended in 5 minutes. Only 12 calls in 3 month attended in more than 5 minutes which were very less in number. No. of call and room distance and attending call are all described on above table 3 as per the room no and time taken for the attending the calls. In Figure 1 is call response time duration 94.96% of call bells were attended in 1 minute, 3.84% call bells were attended in 2 minutes, 0.963% of call bells were attended in 3 minutes where as 0.21% of call bells were attended in 4 minutes and 0.14% call bells attended in 5 minutes.

**Table 3. Time taken for attending the call bell for each room and the distance of room from the nursing station along with total calls generated from each room for 9<sup>th</sup> floor**

ROOM NO.	NO. OF CALLS	DISTANCE	1 Minute	2 Minute	3 Minute	4 Minute	5 Minute	>5 Minute
901	-	82	-	-	-	-	-	-
902	550	67	520	21	8	1	-	-
903	606	59	569	27	8	1	1	-
904	374	42	365	7	-	-	-	2
905	335	38	313	15	5	1	1	-
906	463	50	442	17	2	-	1	1
907	780	57	740	32	4	1	2	1
908	810	75	759	37	8	1	2	3
909	742	62	710	28	-	3	1	-
910	542	62	516	18	5	1	1	1
911	584	66	553	23	5	2	1	-
912	581	39	554	21	3	2	1	-
913	-	35	-	-	-	-	-	-
914	296	36	279	12	5	-	-	-
915	494	41	459	18	12	3	-	2
916	743	60	708	27	5	2	1	-
917	599	58	558	30	9	1	-	1
918	405	40	387	12	4	-	1	1
TOTAL	8904	-	8432	345	83	19	13	12



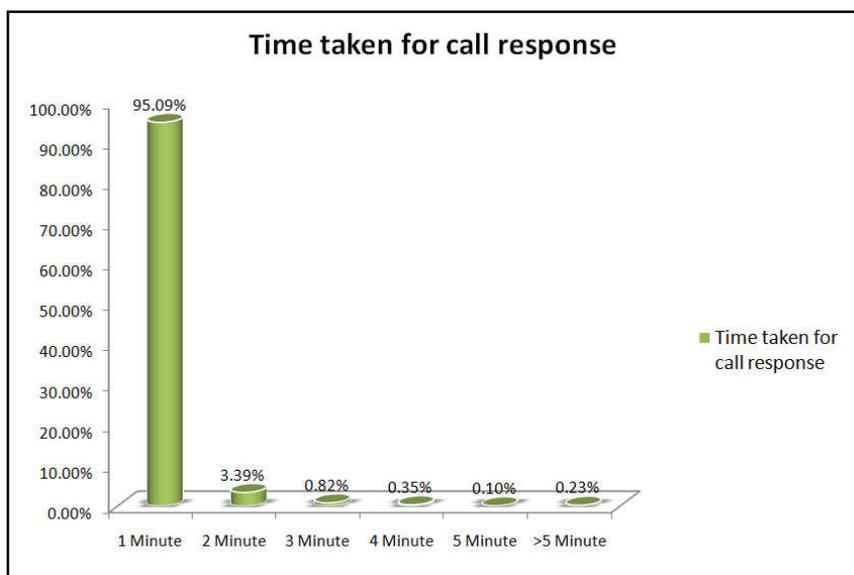
**Figure 1. Percentage of call attended in the time duration for 9<sup>th</sup> floor**

The above Table 3 described about time taken for the call bell and room distance from the nursing counter to each room on 9<sup>th</sup> floor. The highest distance is room no. 901 which was not used for the patient care and which was used for other purpose of the hospital and similarly room no. 913 the nearest room from the nursing counter also not used for patient admission.

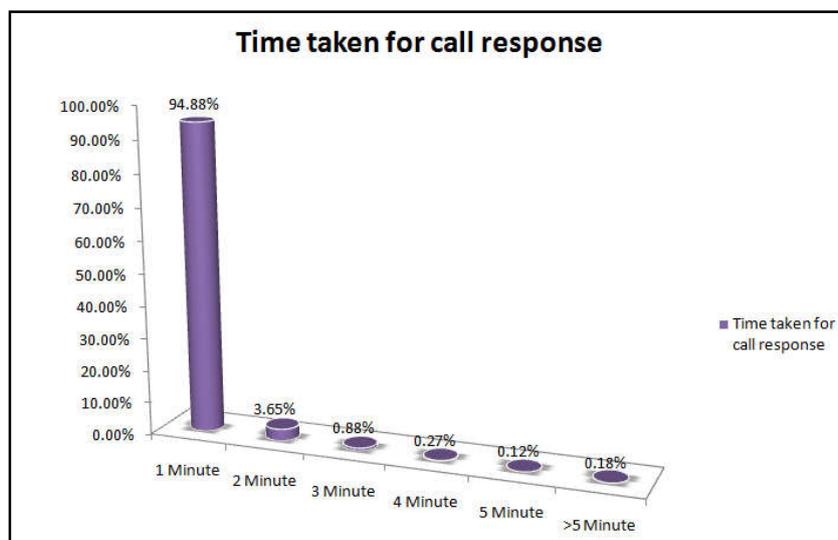
Only 0.13% call bells were attended in more than 5 minutes. Majority of call bells that is 94.96% were attended in 1 minute that is good achievement by nurses for the patient care and fulfillment of need of the patient. In the above table the call bells generated from 10<sup>th</sup> floor were 7639 in total for 3 months among them 7264 call bells were attended in 1 minute which

**Table 4. Time duration to respond call bells for each room and the distance of room from the nursing station along with total call generated from each room for 10<sup>th</sup> floor**

ROOM NO.	NO. OF CALLS	DISTANCE	1 Minute	2 Minute	3 Minute	4 Minute	5 Minute	>5 Minute
1001	56	82	50	3	2	1	-	-
1002	311	67	287	15	1	3	2	3
1003	206	59	197	8	-	-	-	1
1004	186	42	178	3	3	-	-	2
1005	338	38	319	12	5	1	-	1
1006	196	50	185	7	2	2	-	-
1007	490	57	468	14	4	1	1	2
1008	483	75	453	19	7	2	1	1
1009	318	62	303	9	3	2	-	1
1010	663	62	626	25	8	2	1	1
1011	346	66	334	8	3	1	-	-
1012	757	39	725	23	5	3	-	1
1013	510	35	487	16	2	5	-	-
1014	578	36	564	9	4	1	-	-
1015	293	41	284	7	2	-	-	-
1016	656	60	611	35	5	-	1	4
1017	412	58	393	15	-	3	1	-
1018	840	40	800	31	7	-	1	1
TOTAL	7639	-	7264	259	63	27	8	18



**Figure 2. Percentage of call attended in the time duration for 10<sup>th</sup> floor**



**Figure 3. Percentage of total call bells attended in the time duration**

were more in number. The call bells which were responded late were 259 in 2 minutes and 63 were in 3 minutes and 27 call bells in 4 minutes and 8 call bells were in 5 minutes.

Only 18 call bells were responded in more than 5 minutes. The maximum call bells were generated from room no. 1018 which were 840 call bells and in that 800 call bells were attended in 1

minute. And only 31 were delayed which were attended in different time interval. Room No. 1013 and 1006 were the nearest room from the nursing counter and the all calls were attended in 3 minutes and not more than that time. In the above figure 2 shows that majority of call bells that is 95.09% of calls were attended in 1 minute whereas 3.39% of call bells were attended in 2 minute and 0.82% of calls were attended in 3 minute. The 0.35% calls were attended in 4 minutes and 0.10% call were attended in 5 minutes. Only 0.23% call bells were responded in more than 5 minutes. Similarly on both the floor majority of call bells were attended in 1 minute which is good achievement and nurses are conscious to respond to each of the single call which was generated from the patient. The above figure 3 shows that 94.88% of total calls were attended in 1 minute, which was a highest and 3.65% of calls were attended in 2 minutes and 0.88% of calls were attended in 3 minutes where as 0.27% of calls were attended in 4 minutes and 0.12% of calls were attended in 5 minutes. Only 0.18% of calls were attended in more than 5 minutes. The study has proven that the infrastructure of Dr L H Hiranandani Hospital from the nursing counter to the patient bed is contributing factor for attending call bell generated from the patient. Majority of call bells 94.88% were attended by nurses in 1 minute because of equally distributed bed on both the side of nursing counter. Respond to the call generated from the patient side is the primary priority of nurses who working in the patient care. Our infrastructure is soothing to the nurses for minimizing the attending of call and respond to the patient need. Only few calls taken more time because of the room distance and if the nurse was busy with some other task. The above study has resulted that 94.88% of calls were attended in 1 minute which shows that our nurses are attending call in minimum time and infrastructure is contributing to minimize the time taken by nurse for attending the patient call bell.

## DISCUSSION

The call bell system is primary tool for the patient to communicate with the nurse. By pressing the call bell button the communication transferred to the nursing station, where a group of people can see and respond to the call bell. The call bell system also generates the basic data of call bell generated from which room no. and time taken by staff to respond the call bell and the location. The purpose of this study is to identify the patient call bell response and how infrastructure is helping the nurses to attending the patient call bell. The patient room cannot be patient care for every time and every day, the nurse has other task to complete in the shift, so many a time nurses will be out of the patient room for other work. When the call generate from the patient room many a time it give frustration to the nurses but they need to attend it. The primary goal of nurse is to fulfill the patient need and attend patient for any help. The call response system helps the nurses to identify the patient need and respond to their need (Langley, 1996; Murphy, 1997 and Sheila Roszell, 2009). Many of the study has shown that the call bell response monitoring and responding to call bell will give patient satisfaction and attentive towards the patient care. The nurse respond to patient care and patient satisfaction also matters in the hospitalized patient. Similarly in our study its proven that the majority of call bells 94.88% were attended in 1 minute which impacted on the patient satisfaction and fulfilled the patient need by prioritizing the other work. Responding to patient call remains always our primary goal (Rashid, 2006 and Meade, 2006). Study showed that the call bell response is equally proportional

to patient outcome or address any emergency, nurses should be alert enough to answer each of the call gently and immediately and in our study nurses showed that they responded immediately after the call generate from the patient room (Deitrick, 2006). In our study our primary goal is to monitor call bell response and time taken by nurse to attain call bell. 94.88% of call bells were attended in 1 minute which were the highest and at the good target. The only 0.18% of calls was attended in more than 5 minutes. The call were attended late because of nurses were busy with some other task and other work. The primary goal of nurse is to address need of the patient. In our hospital as soon as the patient admitted the room orientation was done by assigned nurse. In room orientation call bell system also explain to patient. When patient generate call from any area in patient room, nurse should attend it with immediate effect and see the patient need. Nursing work with many other priorities but if patient call than nurse should attend it first. Each of the call bells recorded in the system and time duration taken by nurse also recorded in the system for call response.

Our aim of the study was infrastructure comfort to the nurses for attending the call bell of the patient. Our study has proven that the hospital infrastructure is one of the factors where nurse can attend the call in minimum time period. Majority of call bells 94.88% were attended in 1 minute that is good achievement and it's because of infrastructure and nurses alert to the call bell. Studies showed that hourly round to the patient side also minimize the call bell from the patient. The calls generated in our study are also less as compared to the other study which shows that nurse are taking round to the patient side (Culley, 2008). The other factors are also associated with call bell response monitoring that is infrastructure and working time along with nurses alertness and condition of ward. Our study has proven that call bell generated by patients is attended immediately. 94.88% calls were attended in 1 minute. The infrastructure of hospital is befitting and equal distribution of rooms on nurse's counter helped the nurses for attending the call in minimum time.

## Conclusion

Call bell is the primary key in the hospital to communicate the patient need to the health care professionals. To attend the call bell in minimum time reflects the patient satisfaction and improve the patient outcome. In this study 94.88% call bells were attended within one minute which proved that nurse are alert and take minimum time to respond the call bell. Our study also proved that our infrastructure is too good that from nurses counter rooms are equally divided on both the sides so nurse will take minimum time to attend the call bell. The call generated from the patient room and responded by nurse, the time is monitored from call bell system monitoring on nurses counter. Infrastructure of Dr L H Hiranandani hospital is contributing factor for minimizing the time to attend the call bell. Attending the patient call bell in minimum time duration remains our primary goal.

## Limitations

1. We have only monitored call response time but not monitored the time taken by the nurse to complete the task given by patient.
2. We have only monitored call for limited floor not for entire hospital.

3. On 9<sup>th</sup> floor 2 rooms we are not using for patient admission which is the nearest and longest room from the nursing counter.
4. The call bells attended in more than 5 minutes do not have any reason except the nurse failed to cancel the bell before attending to the patient's needs.
5. The call bell monitored through the system so if the nurse first attended the patient then stop the call bell then the time duration increased.

### Recommendations

1. Study can be done for entire hospital patients / beds.
2. Study can be done to check the call bell response and time taken by nurse to fulfill the need.
3. Study can be done for one year with different setting.

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